



## COURSE OUTLINE

### 1. **Course:** MATH 311, Linear Methods II - Spring 2022

Lecture 01 : MWF 10:00 - 11:50 in ICT 114

Instructor	Email	Phone	Office	Hours
Dr Jerrod Smith	jerrod.smith@ucalgary.ca	403 220-6766	MS 442	Tuesday 10 - 10:50 AM, Friday 9 - 9:45 AM, or By Appointment

### Instructor Office Hour Information (Online)

Dr. Smith's office hours will be held on Zoom: <https://ucalgary.zoom.us/j/93034180899> (Passcode: ilovemath).

See D2L for the office hour schedule and appointment booking details.

### Online Drop-in Help and Appointments with Graduate Teaching Assistants

See D2L for additional information.

To account for any necessary transition to remote learning for the current semester, courses with in-person lectures, labs, or tutorials may be shifted to remote delivery for a certain period of time. In addition, adjustments may be made to the modality and format of assessments and deadlines, as well as to other course components and/or requirements, so that all coursework tasks are in line with the necessary and evolving health precautions for all involved (students and staff).

### In Person Delivery Details:

#### Classes are in-person.

- Students will complete pre-class and post-class activities online (recommended reading, watching content videos, completing for-credit homework and non-credit worksheets).
- During class, along with periods of instruction, students will work in pairs/small groups on active learning activities (non-credit worksheets, group discussions, etc.) with the guidance of the instructor.
- In-class activities will also include **for-credit Top Hat questions** (see below).

### Supplementary online content (videos)

The supplementary content videos and course notes posted to D2L cover fundamental concepts and examples. While these videos are not a replacement for attending classes, we encourage you to make use of them to reinforce key ideas.

If you are not feeling well, or you have any symptoms of respiratory illness, we do encourage you to stay home and **watch the pre-recorded content videos**, work on worksheets, etc. for the topics you miss in class. Instructor office hours and drop-in help hours with graduate teaching assistants will be held **online** to provide additional support.

### Tutorials are in-person.

- Tutorials will consist of individual and group work activities, and question and answer periods (e.g., homework help) with graduate teaching assistants.

**Note:** To succeed in this course, students must engage with the **weekly non-credit worksheets posted** on D2L (these are test-level questions). Worksheets will form the primary material discussed during tutorials and some classes. Solutions will be provided at the **end of the week** to provide sufficient opportunity to engage with the problems.

### Re-Entry Protocol for Labs and Classrooms:

To limit the spread of COVID-19 on campus, the University of Calgary has implemented safety measures to

ensure the campus is a safe and welcoming space for students, faculty and staff. The most current safety information for campus can be found [here](#).

### **Course Site:**

D2L: MATH 311 L01-(Winter 2022)-Linear Methods II

### **Email policy**

All questions of a personal nature (e.g. accommodations, missed assessments) should be directed to your course instructor (jerrod.smith@ucalgary.ca). You can usually expect a response within 48 hours (except on weekends and holidays).

### **Questions about math**

Questions about mathematics are best answered during class, tutorial, office hours, or during drop-in help sessions **or** posted to the **D2L Discussion boards** (most Q&A discussion boards will include the option to post anonymously).

- Questions about mathematics **will not** be answered via email (typing math in an email doesn't work well).

### **Frequently Asked Questions (FAQ)**

Questions about the **course organization / administration** should be posted to the **Frequently Asked Questions (FAQ)** discussion board on D2L.

**Note:** Students must use their U of C account for all course correspondence.

### **Equity Diversity & Inclusion:**

The University of Calgary is committed to creating an equitable, diverse and inclusive campus, and condemns harm and discrimination of any form. We value all persons regardless of their race, gender, ethnicity, age, LGBTQIA2S+ identity and expression, disability, religion, spirituality, and socioeconomic status. The Faculty of Science strives to extend these values in every aspect of our courses, research, and teachings to better promote academic excellence and foster belonging for all.

### **Course Outcomes:**

- Explore the relationship between key linear algebra concepts and their geometric representation.
- Seek to apply linear algebra techniques to a variety of practical problems.
- Read and create proofs of mathematical statements about topics covered in the course.
- State all of the technical definitions covered in the course (such as a vector space, span, independence, dimension, linear transformation, kernel, image, and other terms)
- State all of the relevant theorems covered in the course
- Use these definitions and theorems from memory to construct solutions to problems and/or proofs.
- Verify that an abstract mathematical object satisfies a given definition, or is a counterexample
- Analyze a finite dimensional vector space and its properties, including the basis structure of vector spaces
- Understand the concept of a linear transformation as a map from one vector space to another, and to be able to construct such maps given a basis of the domain
- Use the Gram-Schmidt process to produce an orthonormal basis

### **2. Requisites:**

See section [3.5.C](#) in the Faculty of Science section of the online Calendar.

### **Prerequisite(s):**

Mathematics 211 or 213.

**Antirequisite(s):**

Credit for Mathematics 311 and 313 will not be allowed.

**3. Grading:**

The University policy on grading and related matters is described in [F.1](#) and [F.2](#) of the online University Calendar.

In determining the overall grade in the course the following weights will be used:

Course Component	Weight	Due Date (duration for exams)	Modality for exams	Location for exams
Writing Assignment (D2L Discussions; 6 equal weight) <sup>1</sup>	18%	Ongoing		
Quizzes 1 - 5 (Best 4 out of 5, equal weight) <sup>2</sup>	48%	Ongoing		
Online Homework (x 6, equal weight) <sup>3</sup>	12%	Ongoing		
Top Hat <sup>4</sup>	10%	Ongoing		
Registrar Scheduled Final Exam <sup>5</sup>	12%	Will be available when the final exam schedule is released by the Registrar	in person	Will be available when the final exam schedule is released by the Registrar

<sup>1</sup> Students will complete 6 group discussion activities called: "Writing Assignments". Original posts are due on Wednesdays at 11:59 PM & Replies to each group member are due 72 hours later on Saturdays at 11:59 PM. Original post due dates: May 11, May 18, May 25, June 1, June 8, June 15

<sup>2</sup> Quizzes take place in-class from 11:00 - 11:50 AM on Fridays: May 13, May 20, May 27, June 3, and June 10. During any necessary periods of remote learning, students will complete quizzes online via D2L Dropbox on the dates above (additional details will be provided to students via D2L in this situation).

<sup>3</sup> Online Homework (via WeBWork) is due on Thursdays at 11:59 PM on the following dates: May 12, May 19, May 26, June 2, June 9 and June 16.

<sup>4</sup> Top Hat includes in-class and post-class activities. Top Hat questions are weighted as 50% participation and 50% correctness. All Top-Hat questions asked in-class, and some additional questions, will be assigned with an additional attempt after classes to facilitate participation by students who are not able to attend class due to illness. All Top Hat questions are due at 11:59 PM on Thursday, June 16.

<sup>5</sup> Classes are in-person so Quiz #6 (Final Exam) will be in-person. Additional details will be provided to students via D2L. Note: the single lowest score from Quizzes #1 - 5 will be dropped; however, the Quiz #6 score will NOT be dropped.

Each piece of work (reports, assignments, quizzes, midterm exam(s) or final examination) submitted by the student will be assigned a grade. The student's grade for each component listed above will be combined with the indicated weights to produce an overall percentage for the course, which will be used to determine the course letter grade.

The conversion between a percentage grade and letter grade is as follows.

	A+	A	A-	B+	B	B-	C+	C	C-	D+	D
<b>Minimum % Required</b>	95 %	90 %	85 %	80%	76%	72 %	68 %	64%	60%	55 %	50 %

This course will have a Registrar Scheduled Final exam that will be delivered in-person and on campus. [The Final Examination Schedule](#) will be published by the Registrar's Office approximately one month after the start of the term. The final exam for this course will be designed to be completed within 1.5 hours.

**See D2L > Course Information for a detailed schedule of topics and assessments deadlines.**

**\* Online Homework (WeBWork)**

- All questions are equally weighted; all assignments are of equal weight.
- Online homework assignments have a **computational focus**.

**\*\* Writing Assignments (Discussion Posts & Replies):** All discussion posts will be on the D2L Discussion boards. Original discussion posts are due on Wednesdays at 11:59 PM MT and replies to each group member are due 72-hours later on Saturdays at 11:59 PM MT. For each Discussion assignment students will be placed in

randomized groups of four or five.

- **Original posts** assessed as “acceptable (1 pt.)” or “unacceptable (0 pts.)” based on the following:
  - At a minimum: “acceptable” posts will be submitted by the deadline, within the indicated word counts AND/OR include attachments if required, and address the discussion prompt. Writing will be of good quality, with correct spelling and grammar.
- **Replies** to each group member will be assessed as "acceptable (2 pts.)", "needs improvement (1 pt.)" or "unacceptable (0 pts)".
  - At a minimum: "acceptable" posts will be submitted to each participating group member by the deadline, within the indicated word counts, address the discussion prompt, as well as include a rubric-based assessment if applicable. At a minimum "needs improvement" posts will be submitted to each participating group member by the deadline.

### \*\*\* Top Hat

- **Top Hat questions will form part of the in-class and post-class activities for each week.**
  - For credit Top Hat questions will be conducted **in-class**.
  - All in-class Top Hat questions, and some additional questions, will be assigned after class with an additional attempt to facilitate participation by those students who cannot attend class due to illness.
- It is recommended that students complete post-class Top Hat questions while watching content videos and reading fill-in-the-blank course lecture notes.
- Top Hat questions are graded as 50% participation + 50% correctness
  - Students will typically have two attempts at each Top Hat question.

### \*\*\*\* Quizzes 1 - 5 (during the term, 50 minutes)

- Quizzes have a conceptual focus.
- Students will be assessed both on mathematical correctness and quality of mathematical writing.
- **The lowest single quiz score from Quizzes 1 - 5 will be dropped from final grade calculations .**
  - **If a student misses one quiz during the term, Quizzes 1 - 5, (for any reason), then this is the quiz score that will be dropped.**
- Quizzes will be held on Fridays in-class from 11:00 - 11:50 AM starting on May 13, 2022
- **No aids allowed** (closed book, no calculators, no electronic devices, etc.).
  - During any necessary periods of remote learning, additional details on quiz format will be provided via D2L.

### \*\*\*\*\* Final Assessment (Quiz #6)

- Quiz #6 ("Final Examination") to be completed during the final examination period, scheduled by the registrar.
- Students will be assessed both on mathematical correctness and quality of mathematical writing.
- **Quiz #6 will be 90 minutes (1.5 hours) in duration.**
- Additional details on the format of Quiz #6 will be posted to D2L.
  - In the case that the Final Examination ("Quiz 6") takes place during a period of remote learning, additional details on quiz format will be provided via D2L.

The University of Calgary offers a [flexible grade option](https://science.ucalgary.ca/current-students/undergraduate/program-advising/flexible-grading-option-cg-grade), Credit Granted (CG) to support student’s breadth of learning and student wellness. Faculty units may have additional requirements or restrictions for the use of the CG grade at the faculty, degree or program level. To see the full list of Faculty of Science courses where CG is not eligible, please visit the following website: <https://science.ucalgary.ca/current-students/undergraduate/program-advising/flexible-grading-option-cg-grade>

#### 4. Missed Components Of Term Work:

The university has suspended the requirement for students to provide evidence for absences. Please do not attend medical clinics for medical notes or Commissioners for Oaths for statutory declarations.

In the event that a student legitimately fails to submit any online assessment on time (e.g. due to illness etc...), please contact the course coordinator, or the course instructor if this course does not have a coordinator to arrange for a re-adjustment of a submission date. Absences not reported within 48 hours will not be accommodated. If an excused absence is approved, one possible arrangement is that the percentage weight of the legitimately missed assignment could also be pro-rated among the components of the course. This option is at the discretion of the coordinator and may not be a viable option based on the design of this course.

**If you miss a WeBWork Assignment deadline...**

- No extensions will be granted barring exceptional circumstances (see below: (\*)).
- Do not leave your WeBWork to the last day -- complete it early!

**If you miss a Writing Assignment (D2L Discussion Post + Replies)...**

- No extensions will be granted barring exceptional circumstances (see below: (\*)).

**If you miss in-class Top Hat questions...**

- Top Hat questions asked in-class will be reassigned after class with an additional attempt.
  - **Complete all Top Hat questions by June 16 at 11:59 PM.**
- No additional extensions will be granted.

**If you miss one of Quizzes #1 - 5 ...**

- The lowest single quiz score from Quizzes 1 - 5 will be dropped from final grade calculations; therefore **if a student misses one quiz during the term (for any reason), then this is the quiz score that will be dropped.**
- If a student misses two more more quizzes during the term due to exceptional circumstances (see below: (\*)), then they must contact the instructor within 48 hours.
  - If a student misses two or more quizzes during the term, then accommodation (e.g, increasing the weight of Quiz #6) will be made on a case-by-case basis.

**If a student misses Quiz #6 (Final Exam) due to exceptional circumstances ...**

- **The following applies in exceptional circumstances only** (see below: (\*)):
  - Students missing Quiz #6 due to exceptional circumstances will have the **option** of counting the single dropped quiz from Quizzes 1 - 5 as the Quiz 6 grade, **OR** applying for a Deferred Final Examination (see the University Calendar for details).
  - Students must contact the course instructor by email within 48 hours to indicate their intention to use the dropped quiz score in place of Quiz #6 **in writing**.

(\*) If exceptional circumstances (e.g., extended illness, emergency, etc.) arise: contact your coordinator by email within 48 hours of the assignment deadline. Accommodations in exceptional circumstances will be made on a case-by-case basis.

**5. Scheduled Out-of-Class Activities:**

There are no scheduled out of class activities for this course.

## 6. Course Materials:

Recommended Textbook(s):

W. K. Nicholson, *Linear Algebra with Applications*. Open Texts, available at: [https://lila1.lyryx.com/textbooks/OPEN\\_LAWA\\_1/marketing/Nicholson-OpenLAWA-2021A.pdf](https://lila1.lyryx.com/textbooks/OPEN_LAWA_1/marketing/Nicholson-OpenLAWA-2021A.pdf).  
Book of Proof, *Richard Hammack*: Richard Hammack. Available at <https://www.people.vcu.edu/~rhammack/BookOfProof/>.

### Technology Requirements

#### Writing Assignments (and Quizzes during Remote Learning, if applicable)

Students must be able to produce a **single PDF file** of their **handwritten** work to be uploaded to D2L (discussion boards and/or dropbox).

Students may do this by **scanning** their written work (with a scanner or smartphone app) or using a **tablet** and **saving the file as a PDF**.

- If you want to scan your written work with your smartphone, try the \*free\* Adobe Scan Digital PDF Scanner app available here:
  - for iPhone / iPad <https://tinyurl.com/tlhhkj3>
  - and on Google Play <https://tinyurl.com/v7csw88>

Alternatively, students wishing to type their Writing Assignments may use the equation editor features in D2L and/or LaTeX to typeset their work. See **Mathematical Writing Resources** on D2L.

During periods of remote learning, quizzes must be submitted as **handwritten** work as a **single PDF file**.

### Top Hat

We will be using **Top Hat** for synchronous and asynchronous active learning exercises. University of Calgary students may access Top Hat at **no cost**. **Students must use their @ucalgary email address for their Top Hat account**.

**Students must ensure that their UCID is entered in their Top Hat account information.**

Students will receive an direct invitation to the Top Hat course to their @ucalgary email account on/after the first day of classes.

You can access our Top Hat course MATH 311 Linear Methods II P2022 via:

- A web browser on your computer\*\* at <http://app-tophat.com>,
- or The Top Hat smartphone/tablet app

**\*\* Recommended option:** Using a web browser on a computer is the best option for viewing mathematics.

In order to successfully engage in their learning experiences at the University of Calgary, students taking online, remote and blended courses are required to have reliable access to the following technology:

- A computer with a supported operating system, as well as the latest security, and malware updates;
- A current and updated web browser;
- Webcam/Camera (built-in or external);
- Microphone and speaker (built-in or external), or headset with microphone;
- Current antivirus and/or firewall software enabled;
- Stable internet connection.

For more information please refer to the UofC [ELearning](#) online website.

## 7. Examination Policy:

**NOTE:** On all assessments, **be wary** of using external internet resources (course notes, You Tube videos, etc.); you will be expected to use the **standard notation, definitions, and constructions** used in the **videos** and **fill-in-the-blank notes**. Outside resources may use **different conventions** for notation, definitions, and standard constructions.

### Quizzes 1 - 6 Expectations

- The Quizzes are intended to help you **assess your understanding** of fundamental concepts, definitions and theorems, as well as to assess your problem solving skills and mathematical writing.
- You **MUST complete quizzes on your own**, and **without help from your peers**
- There are **no aids allowed** on quizzes (closed book, no calculators, no electronic devices, etc.)

During any necessary periods of remote learning, *additional details regarding Quiz expectations will be posted to D2L.*

### Writing Assignment (D2L Discussion Posts)

- Writing Assignments (via D2L Discussion posts) are intended to help you practice problem solving and mathematical writing.
- You should use your notes, the topic videos, and the course text(s) to help you complete the original posts.
- You should **complete your original posts on your own** to ensure that you receive maximum benefit from reading your peer's posts and receiving feedback on your posts from your peers.
- Often, corrected proofs and additional guides will be posted to help you give high-quality replies to your peers.
- **You may NOT use:** homework answer services, like Chegg, Slader, etc.
- **You may NOT use:** mathematics question & answer forums like Mathematics Stack Exchange

### WeBWork Homework and Top Hat Expectations

- WeBWork Homework and Top Hat questions are intended to help you practice **computational skills** and problem solving, and to **check your theoretical understanding**.
- You should use your notes, the topic videos, and the course text(s) & lecture notes to help you complete the assignments.
- You may discuss assignment problems with your peers on the D2L discussion boards; however, you should complete your assignments on your own (i.e., independently).
- **You may NOT use:** homework answer services, like Chegg.com, Slader, etc.
- **You may NOT use:** mathematics question & answer forums like Mathematics Stack Exchange

We recommend that you use (online) computer algebra systems like Wolfram Alpha, Mathematica, **only to check any calculations that you have already completed by-hand.**

Students should also read the Calendar, [Section G](#), on Examinations.

## 8. Approved Mandatory And Optional Course Supplemental Fees:

There are no mandatory or optional course supplemental fees for this course.

## 9. Writing Across The Curriculum Statement:

For all components of the course, in any written work, the quality of the student's writing (language, spelling, grammar, presentation etc.) can be a factor in the evaluation of the work. See also Section [E.2](#) of the University Calendar.

**On all assessments both mathematical correctness and quality of mathematical writing / communication will be assessed.**

## 10. Human Studies Statement:

If you agree, your course work may be used for research purposes. Your responses will remain anonymous and confidential. Grouped data (no individual responses) may be used in academic presentations and publications. Participation in such research is voluntary and will not influence grades in this course. Students' signed consent forms will be withheld from instructors until after final grades are submitted. More information will be provided at the time student participation is requested.

See also [Section E.5](#) of the University Calendar.

## 11. Reappraisal Of Grades:

A student wishing a reappraisal, should first attempt to review the graded work with the Course coordinator/instructor or department offering the course. Students with sufficient academic grounds may request a reappraisal. Non-academic grounds are not relevant for grade reappraisals. Students should be aware that the grade being reappraised may be raised, lowered or remain the same. See [Section I.3](#) of the University Calendar.

- a. **Term Work:** The student should present their rationale as effectively and as fully as possible to the Course coordinator/instructor within **ten business days** of either being notified about the mark, or of the item's return to the class. If the student is not satisfied with the outcome, the student shall submit the Reappraisal of Graded Term work [form](#) to the department in which the course is offered within 2 business days of receiving the decision from the instructor. The Department will arrange for a reappraisal of the work within the next ten business days. The reappraisal will only be considered if the student provides a detailed rationale that outlines where and for what reason an error is suspected. See sections [I.1](#) and [I.2](#) of the University Calendar
- b. **Final Exam:** The student shall submit the request to Enrolment Services. See [Section I.3](#) of the University Calendar.

## 12. Other Important Information For Students:

- a. **Mental Health** The University of Calgary recognizes the pivotal role that student mental health plays in physical health, social connectedness and academic success, and aspires to create a caring and supportive campus community where individuals can freely talk about mental health and receive supports when needed. We encourage you to explore the mental health resources available throughout the university community, such as counselling, self-help resources, peer support or skills-building available through the SU Wellness Centre (Room 370, MacEwan Student Centre, [Mental Health Services Website](#)) and the Campus Mental Health Strategy website ([Mental Health](#)).
- b. **SU Wellness Services:** For more information, see their [website](#) or call [403-210-9355](#).
- c. **Sexual Violence:** The Sexual Violence Support Advocate, Carla Bertsch, can provide confidential support and information regarding sexual violence to all members of the university community. Carla can be reached by email ([svsa@ucalgary.ca](mailto:svsa@ucalgary.ca)) or phone at [403-220-2208](#). The complete University of Calgary policy on sexual violence can be viewed [here](#).
- d. **Misconduct:** Academic integrity is the foundation of the development and acquisition of knowledge and is based on values of honesty, trust, responsibility, and respect. We expect members of our community to act with integrity. Research integrity, ethics, and principles of conduct are key to academic integrity. Members of our campus community are required to abide by our institutional [Code of Conduct](#) and promote academic integrity in upholding the University of Calgary's reputation of excellence. Some examples of academic misconduct include but are not limited to: posting course material to online platforms or file sharing without the course instructor's consent; submitting or presenting work as if it were the student's own work; submitting or presenting work in one course which has also been submitted in another course without the instructor's permission; borrowing experimental values from others without the instructor's approval; falsification/fabrication of experimental values in a report. Please read the following to inform yourself more on academic integrity:

[Student Handbook on Academic Integrity](#)  
[Student Academic Misconduct Policy](#) and [Procedure](#)  
[Faculty of Science Academic Misconduct Process](#)  
[Research Integrity Policy](#)

Additional information is available on the [Student Success Centre Academic Integrity page](#)

### e. Academic Accommodation Policy:

It is the student's responsibility to request academic accommodations according to the University policies and procedures listed below. The student accommodation policy can be found at:



<https://www.ucalgary.ca/legal-services/sites/default/files/teams/1/Policies-Student-Accommodation-Policy.pdf>

Students needing an accommodation because of a disability or medical condition should communicate this need to Student Accessibility Services in accordance with the Procedure for Accommodations for Students with Disabilities: <https://www.ucalgary.ca/legal-services/sites/default/files/teams/1/Policies-Accommodation-for-Students-with-Disabilities-Procedure.pdf>.

Students needing an accommodation in relation to their coursework or to fulfil requirements for a graduate degree, based on a Protected Ground other than Disability, should communicate this need, by filling out the [Request for Academic Accommodation Form](#) and sending it to Mark Bauer by email [bauerm@ucalgary.ca](mailto:bauerm@ucalgary.ca) preferably 10 business days before the due date of an assessment or scheduled absence.

- f. **Freedom of Information and Privacy:** This course is conducted in accordance with the Freedom of Information and Protection of Privacy Act (FOIPP). Students should identify themselves on all written work by placing their name on the front page and their ID number on each subsequent page. For more information, see [Legal Services](#) website.
- g. **Student Union Information:** [SU contact](#), Email SU Science Rep: [sciencerep1@su.ucalgary.ca](mailto:sciencerep1@su.ucalgary.ca), [Student Ombudsman](#)
- h. **Surveys:** At the University of Calgary, feedback through the Universal Student Ratings of Instruction ([USRI](#)) survey and the Faculty of Science Teaching Feedback form provides valuable information to help with evaluating instruction, enhancing learning and teaching, and selecting courses. Your responses make a difference - please participate in these surveys.
- i. **Copyright of Course Materials:** All course materials (including those posted on the course D2L site, a course website, or used in any teaching activity such as (but not limited to) examinations, quizzes, assignments, laboratory manuals, lecture slides or lecture materials and other course notes) are protected by law. These materials are for the sole use of students registered in this course and must not be redistributed. Sharing these materials with anyone else would be a breach of the terms and conditions governing student access to D2L, as well as a violation of the copyright in these materials, and may be pursued as a case of student academic or [non-academic misconduct](#), in addition to any other remedies available at law.

Electronically Approved - May 03 2022 16:43

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**Department Approval**